

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the captioned application.

Listing of Claims:

Claim 1: (Original) A method of placing, within a wellbore containing a fluid, a bottom-hole tool assembly suspended by a support string, said method comprising the bottom-hole tool fabrication step of coordinating the distributed weight of said assembly with the distributed volume of said assembly and the specific gravity of said wellbore fluid to substantially reduce a bottom hole tool support load on said support string.

Claim 2. (Original) A method as described by claim 1 wherein said bottom-hole assembly is a perforating gun.

Claim 3. (Original) A method as described by claim 1 wherein said wellbore fluid is predominantly a liquid.

Claim 4. (Original) A method of placing a bottom-hole tool assembly within a wellbore containing a fluid wherein at least a portion of the wellbore directional course is advanced along a slope that is less than an angle of repose for said tool assembly against a wall surface of said wellbore, said method comprising the step of coordinating the distributed weight of said assembly with the distributed volume of said assembly and the specific gravity of said fluid to predetermine a bearing force of said assembly against said wellbore wall surface.

Claim 5. (Original) A method as described by claim 4 wherein the bearing force of said tool assembly is biased to buoy said assembly substantially against uppermost elements of said wall surface.

Claim 6. (Original) A method as described by claim 4 wherein the buoyancy of said tool assembly is biased to sink said assembly against substantially lowermost elements of said wall surface.

Claim 7. (Original) A method as described by claim 4 wherein said bottom-hole tool assembly is a perforating gun.

Claim 8. (Original) A method as described by claim 5 wherein said bottom-hole tool assembly is a perforating gun.

Claim 9. (Original) A method as described by claim 6 wherein said bottom-hole tool assembly is a perforating gun.

Claim 10. (Currently Amended) A well perforation apparatus comprising a shaped charge loading tube having a first distributed weight enclosed within an axially elongated outer gun tube, said outer gun tube having a second distributed weight and a distributed volume, said distributed volume and said first and second distributed weights being coordinated for a predetermined, approximately neutral, apparatus buoyancy, ballast means distributed along a length of said outer gun tube asymmetrically ~~eccentrically~~ of a gun tube axis and a plurality of shaped explosive charges operatively secured within said loading tube for perforating a subterranean well at a predetermined orientation angle relative to vertical.

Claim 11. (Previously presented) A well perforation apparatus as described by claim 10 wherein said outer gun tube is fabricated from a composite material comprising is a fiber and polymer matrix.

Claim 12. (Previously presented) A well perforation apparatus as described by claim 11 wherein the fiber in said matrix is glass.

Claim 13. (Previously presented) A well perforation apparatus as described by claim 11 wherein the fiber in said matrix is carbon.

Claim 14. (Previously presented) A well perforation apparatus as described by claim 11 wherein the fiber in said matrix is polyaramid.

Claim 15. (Previously presented) A well perforation apparatus as described by claim 11 wherein the polymer in said matrix is an epoxy.

Claim 16. (Previously presented) A well perforation apparatus as described by claim 11 wherein the polymer in said matrix is an ester.

Claim 17. (Previously presented) A well perforation apparatus as described by claim 10 wherein said loading tube is fabricated with light weight material.

Claim 18. (Previously presented) A well perforation apparatus as described by claim 17 wherein the fabrication material of said loading tube is a plastic composite.

Claim 19. (Previously presented) A well perforation apparatus as described by claim 17 wherein the fabrication material of said loading tube is a foamed polymer.

Claim 20. (Previously presented) A well perforation apparatus as described by claim 17 wherein the fabrication material of said loading tube is a composite material.

Claim 21. (Previously presented) A well perforation apparatus as described by claim 17 wherein the fabrication material of said loading tube is a foamed glass.

Claim 22. (Previously presented) A well perforating gun comprising the assembly of a loading tube, a plurality of shaped charges and an outer gun tube, said loading tube having sockets to secure and angularly orient said shaped charges, an assembly of said loading tube and shaped charges within said outer gun tube providing a predetermined angular orientation of said shaped charges relative to a gravitationally biased plane of said assembly, weight and volume of said loading tube, shaped charges and gun tube being coordinated for a predetermined buoyancy of said assembly.

Claim 23. (Previously presented) A well perforating gun loading tube as described by claim 22 fabricated with a composite material comprising a fiber and polymer matrix.

Claim 24. (Previously presented) A well perforating gun loading tube as described by claim 23 wherein said fiber in said matrix is glass.

Claim 25. (Previously presented) A well perforating gun loading tube as described by claim 23 wherein said fiber in said matrix is carbon.

Claim 26. (Previously presented) A well perforating gun loading tube as described by claim 23 wherein said polymer in said matrix is an epoxy.

Claim 27. (Previously presented) A well perforating gun loading tube as described by claim 23 wherein said polymer in said matrix is an ester.

Claim 28. (Previously presented) A well perforating gun loading tube as described by claim 22 wherein said composite material is a foamed polymer.

Claim 29. (Previously presented) A well perforating gun loading tube as described by claim 22 wherein said composite material is a foamed glass.

Claim 30. (Original) A light weight shaped charge element formed without base casement for operative seating within a loading tube socket.

Claim 31. (Canceled)

Claim 32. (Currently amended) A light weight shaped charge element formed with a paper base casement for operative seating within a loading tube socket as ~~described by claim 31 wherein said base casement is paper.~~

Claim 33. (Currently amended) A light weight shaped charge element formed with an aluminum foil base casement for operative seating within a loading tube socket as ~~described by claim 31 wherein said base casement is aluminum foil.~~

Claim 34. (Canceled)

Claim 35. (Previously presented) A light weight well perforation apparatus comprising the assembly of a light weight shaped charge loading tube enclosed within a composite material outer gun tube and a plurality of light weight shaped explosive charges operatively secured within said loading tube, longitudinally distributed weight and volume respective to said loading tube, shaped charges and outer gun tube being coordinated for a predetermined apparatus buoyancy for perforating a subterranean well bore having an inclination of about an angle of repose or less.

Claim 36 (New) A method as described by claim 4 wherein said step of coordinating the distributed weight of said assembly with the distributed volume of said assembly and the specific gravity of said fluid predetermines a neutral buoyancy having substantially no bearing force of said assembly against said wellbore wall surface.

Claim 37 (New) A well perforation apparatus as described by claim 10 wherein said outer gun tube is fabricated from steel.

Claim 38 (New) A well perforation apparatus as described by claim 10 wherein said outer gun tube is fabricated from aluminum.

Claim 39 (New) A well perforation apparatus as described by claim 10 wherein said outer gun tube is fabricated from aluminum alloy.

Claim 40 (New) A well perforation apparatus as described by claim 10 wherein said outer gun tube is fabricated from magnesium alloy.

Claim 41 (New) A well perforation apparatus as described by claim 10 wherein said outer gun tube is fabricated from titanium alloy.